

The **MINING** *CONGRESS* *JOURNAL*

JUNE, 1932



IN THIS ISSUE:

Time and Industrial Activity;
Congress Session Nearing Close;
Labor Costs and Machine Costs;
Tailing Disposal in the Tri-State
Field; Reducing Haulage Costs Thru
Proper Application of Bearings.



BUILDING *for the Future*

Rome is not the only great human institution that was not "built in a day." Neither was the United States Government. Neither have been any of the more noteworthy or permanent accomplishments of the race. Any structure that is to endure must rest upon a foundation that is secure, and security is never the reward of a moment's effort.



Understanding . . . vision . . . knowledge . . . leadership . . . these coupled with that priceless ingredient *time* . . . are the requisites of all lasting achievement.



In such manner has the American Mining Congress served the American Mining Industry for more than a third of a century.



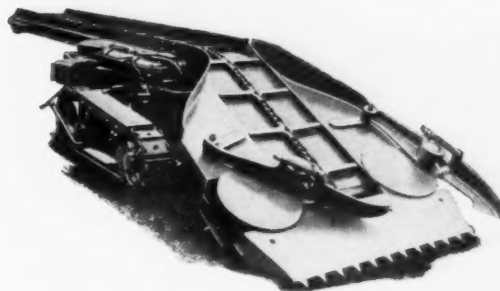
A thorough *understanding* of the Industry's problems; broad, clear *vision* capable of planning their effective solution; sound *knowledge* as to the proper methods of procedure; and skillful, courageous *leadership* are the qualities responsible for the magnificent contributions which this Mining Organization has, throughout the years of its existence, made to the Mining Industry.



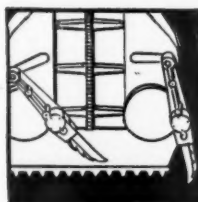
The active cooperation, in the form of individual memberships, of all men sincerely interested in the welfare of this Industry, is earnestly invited.

The
AMERICAN MINING CONGRESS
WASHINGTON, D. C.

The 8 distinctive features of the new JOY 8-BU

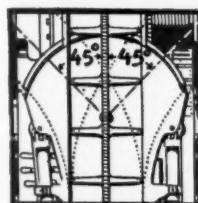


Built upon a principle tested and proved by ten years of successful service, yet designed specifically to meet the exacting operating conditions of today, the new JOY 8-BU combines no less than eight individual features to make it the extremely efficient and economical machine it is.



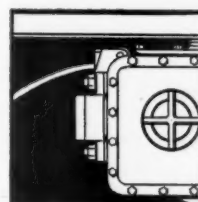
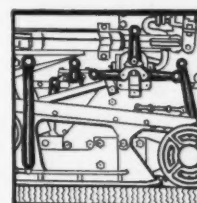
1 Its GATHERING PRINCIPLE—Two powerful rotating arms sweep the coal into an elevating conveyor . . . the same exclusive JOY gathering-principle that loaded more coal in 1931 than all other loaders combined!

2 Its LOW HEIGHT—The overall height of the 8-BU is only 35 inches. This economy of height brings to low-seam properties for the first time, the economies of JOY continuous, high-tonnage production.



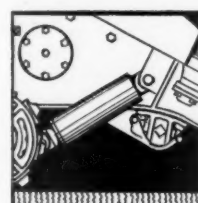
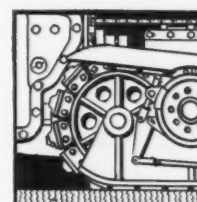
3 Its FLEXIBLE CONVEYOR—The 8-BU conveyor swings in a horizontal arc 45° to either side of center while its vertical elevation is adjustable more than 30 inches to accommodate any variations in mine car heights.

4 Its ONE-MAN CONTROL—All operating levers . . . for steering, reversing, raising or swinging the conveyor, or adjusting the position of the gathering-head . . . are within easy, convenient reach of the one operator.



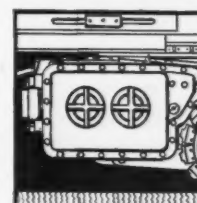
5 Its SAFETY—All power connections and enclosures of the JOY 8-BU have been made in accordance with the permissible requirements of the U. S. Bureau of Mines. The 8-BU is essentially safe!

6 Its SELF-PROPULSION—The 8-BU moves under its own power upon caterpillar treads. It has two speeds forward and two reverse and shifts easily from face to face with a minimum interruption of production.



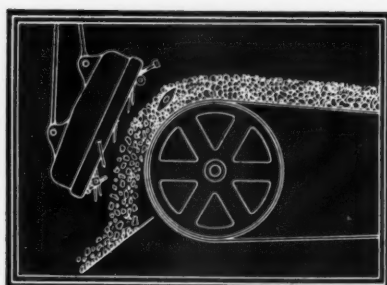
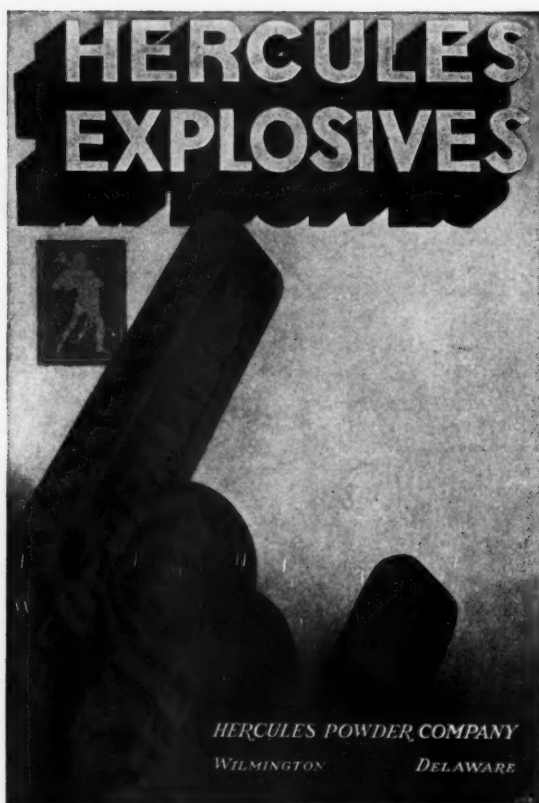
7 Its HYDRAULIC OPERATION—Hydraulic jacks operated by an oil-pressure pump connected directly with the transmission, make easy and speedy the directing of the conveyor and raising or lowering of the gathering-head.

8 Its TRANSMISSION—The 8-BU transmission permits the motor to operate at full speed in one direction at all times, while at the same time allowing any variation desired in the speed of the individual units.



Let us make a survey of your requirements and submit an estimate of the savings that the new JOY 8-BU can effect in your mine. No obligation whatever on your part, of course.

JOY MANUFACTURING COMPANY
FRANKLIN, PENNA.



Tramp iron may easily be converted from a menace to a salvable asset by an EC&M Separator Magnet. These magnets are easily installed, free from maintenance costs and provide the greatest power where the material is deepest. Bulletin 910 gives complete data on capacity and operation. Write for a copy.

The Electric Controller & Mfg. Co.

2700 E. 79th Street, Cleveland, Ohio
Please send SEPARATOR MAGNET Bulletin

NAME
ADDRESS

THE MINING CONGRESS JOURNAL

VOLUME 18, NUMBER 6

CONTENTS JUNE, 1932

Editorials

THE WORLD STABILIZATION CONFERENCE.....	6
PAYING TOO MUCH.....	7
THE TAX BILL.....	7
A SAFE BRIDGE.....	7
THOSE COAL HEARINGS.....	7

Feature Articles

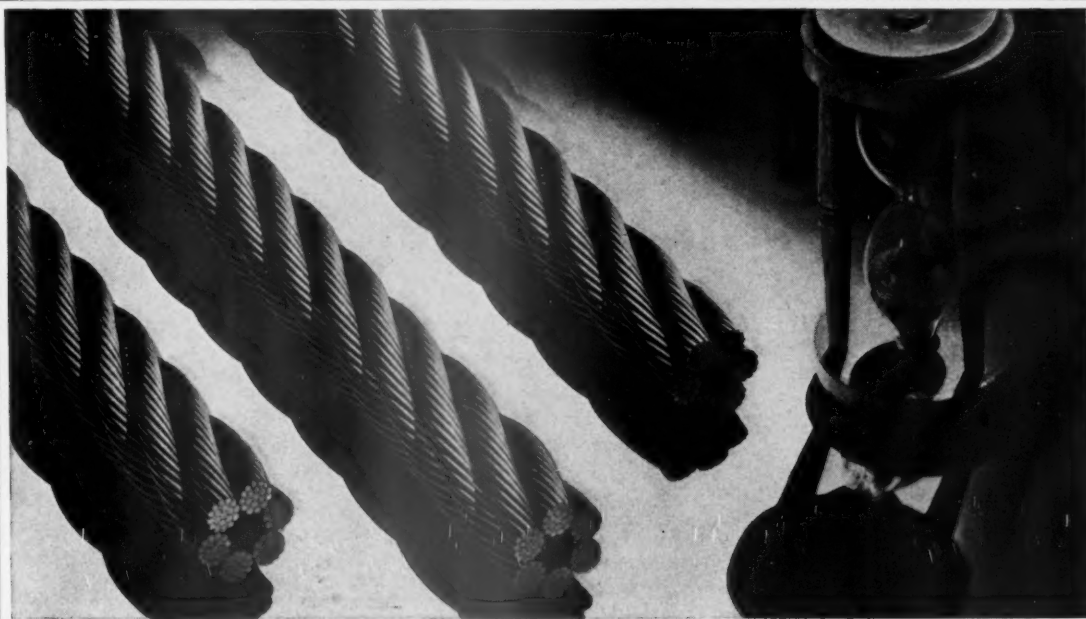
TIME AND INDUSTRIAL ACTIVITY— By T. O. McGrath.....	8
CONGRESS SESSION NEARING CLOSE.....	11
TAILING DISPOSAL IN THE TRI-STATE FIELD— By R. J. Stroup.....	12
LABOR COSTS AND MACHINE COSTS— By G. B. Southward.....	13
REDUCING HAULAGE COSTS THROUGH PROPER APPLICATION OF BEARINGS— By S. M. Weckstein.....	14

Departments

PRACTICAL OPERATING MEN'S DEPARTMENT, METAL..	12
AMERICAN MINING CONGRESS MECHANIZATION SURVEY	13
PRACTICAL OPERATING MEN'S DEPARTMENT, COAL..	14
NEWS OF THE MINING FIELD.....	15
WITH THE MANUFACTURERS.....	17

E. R. COOMBS
Editor
GUY N. BJORGE
Associate Editor
NEWELL G. ALFORD
Associate Editor
ERNEST H. PULLMAN
Legislative Editor
FRANK B. COOK
Art Director
PARKER COTT
Field Representative
FRANK W. MORAN
Field Representative

Published every month by The American Mining Congress, Washington, D. C. Edited under the supervision of James F. Callbreath, Secretary of The American Mining Congress. Copyright 1932 by The American Mining Congress, Munsey Bldg., Washington, D. C. Entered as Second Class Mail Matter January 30, 1915, at the Post Office at Washington, D. C. Published 13 times annually—the first of each month and the 15th of September. Yearly subscription, United States and Canada, \$3.00; Foreign, \$4.00; single copies, \$0.50.



What is the *True* MEASURE of Wire Rope service?

Variations in rope life are experienced by practically every rope user. Ropes encounter varying service circumstances. Operating conditions, as well as rope maintenance and equipment conditions, change from time to time, even on the same piece of equipment. As a result, rope life varies too.

It is easy, therefore, to see why the service given by a single rope is not necessarily a criterion of the *general* service that make or design of rope will provide.

Many years of experience and close contact with thousands of diversified installations of wire rope have convinced this company that there is only one fair and reliable basis on which to compare the service of wire ropes:—the basis of *average* service.

Roebbling is glad to have its ropes put to this severe test. It advocates the "Average Service" method of determining rope cost, in which cost per ton of material handled, mile traveled, or other measuring unit, is based not merely on the service of a single rope but on the *average* service of several ropes.

JOHN A. ROEBLING'S SONS COMPANY, TRENTON, N. J.
Wire • Wire Rope • Copper & Insulated Wires & Cables • Welding Wire • Flat Wire • Wire Cloth & Wire Netting
Branches in Principal Cities

Export Dept.—New York, N.Y.

A plain statement about Wire Rope Economy

Roebbling does not indulge in nor encourage sweeping claims of superior wire rope economy. Such claims, if generally made, would merely confuse the rope user. ¶ For the guidance of rope buyers, however, Roebbling does assert that when gauged by the work performed, NO wire rope, regardless of make or construction, will show lower general average operating costs than Roebbling.

Wire Rope for all purposes

There is no such thing as a wire rope "cure-all". No one design of wire rope is suitable for all purposes. ¶ Roebbling makes wire rope of a great variety of types and constructions, and therefore can supply a wire rope exactly suited to each particular requirement. ¶ The great stamina of all Roebbling Ropes is primarily due to the quality of Roebbling Wire. This Acid Steel Wire is renowned for its fatigue and wearing qualities. No better rope wire is produced. ¶ "BLUE CENTER" STEEL is the highest grade and is generally recommended for severe duty.

JOHN A. ROEBLING'S SONS COMPANY



*A Journal for the entire mining industry
published by The American Mining Congress*

The World Stabilization Conference

THE INSISTENCE of certain interests in the United States that consideration of silver shall be a main feature in the agenda for the World Conference called by Great Britain to assemble in London sometime in the near future seems to be fundamentally unsound.

If it is possible to find a means by which sound money can be provided in adequate volume without consideration of silver, then silver has no right to demand attention. Such sound money must be based on some metallic foundation which cannot be increased or decreased substantially during any limited period and which can command confidence in its real or legalized intrinsic value.

We have a right to insist that silver shall not be excluded from the deliberations of this conference. The one subject which should be the basis of all of its considerations is that of money—money the life blood of commerce—money the measure of value by which exchange is made convenient—money the means by which stored up labor, accumulated capital, may be measured and amassed—money the one common denominator of world business transactions. Its use and abuse are responsible for high prices and low prices, for business depression and panic upon one side and upon the other the inflated prices which lead to panic.

Every authority admits that loss of confidence has been responsible for these conditions. Why was confidence lost? And what must we do to regain that confidence and make it stable and uniform? Every panic in history has been preceded by a wild inflation of prices followed by a scrutiny of the basis of those price levels and the discovery that the real money of the country was not sufficient to support the enormous bubble of credit which had been built upon it.

In an address delivered by the writer in 1908 before the Trans-Mississippi Commercial Congress in San Francisco, Calif., he stated:

"In the Fall of 1907, at a time of great industrial prosperity, when the production of the mines and the factories was the greatest; when every man desiring work was employed at the highest wages known to history; when the production of the farms was enormous; with the balance of foreign trade largely in our favor; with no war or pestilence to blight; with the amount of money per capita larger than ever before in our history; when that great empire builder, James J. Hill, was explaining the enormous cost of the additional railway facilities necessary to handle the increased business of the country, suddenly a startling financial nightmare spread over the country. Many of the

factories and mines ceased operations, its railroad switches were filled with idle freight cars, the paying tellers' windows of our banks were closed, and the conservative, honorable business men of the country with practical unanimity approved the action of the banks in repudiating their obligations, a course absolutely illegal and almost revolutionary. * * * During a period of abnormally high and continually increasing prices, stimulated by the increasing credit which recognized no limit, attention of the financial world was called to the fact that the structure of credit had grown top heavy. Confidence changed to distrust, and those who could get possession of their money hoarded it."

Do not these words describe with reasonable accuracy the conditions of 1929? The panic of 1907 was confined to the United States. The panic of 1929 had its incipency abroad, gradually spreading from one country to another and finally engulfing this country, but the principles involved are the same.

Mr. Leonard P. Ayers in the May 15th issue of the Business Bulletin of the Cleveland Trust Company, in a discussion of the kinds and uses of money, says:

"The money that we use is of two kinds, which we may term primary and derivative, and the money which has suffered the severe shrinkage in volume is the derivative money. It consists of the bank credit that is represented by most of the checks that we receive, as for example those that come to us from corporations as salary payments or dividend payments. Primary money is the currency that we carry about with us in the form of coins and bills, and which we use to make most of our ordinary small purchases. When we think about money we normally and naturally think of this primary money, for it is in this form that we see it every day, and count it, and spend it, and perhaps deposit it in our savings accounts. In reality, however, this primary money is only about one-tenth of all the money the country has and uses in normal times. The other nine-tenths consists of the derivative money paid out and received in the form of bank checks, and with which most of the business of the country is transacted."

It is practically impossible to place any limit upon the credit money which may be accepted as a settlement in business transactions. But we insist that if the real money, the money backed by a metallic reserve, guaranteed by the government could be increased in volume that it would furnish a better support to that pyramid of credit, the loss of confidence in which is responsible for the dire business troubles of the present.

Let the world conference devote its best thought to that fundamental problem, money, without which business cannot be carried on and confidence in which is essential to the maintenance of stable business conditions.

J. H. Cullerath

The MINING CONGRESS JOURNAL

JUNE, 1932
VOLUME 18
NUMBER SIX

Editorials

Paying Too Much

we were absorbing our own production only and living from the 90 percent of our own activities we would be but 10 percent below normal. By throwing 10 percent of our normal production in the ocean and adjusting our money return to 90 percent of normal, we would be vastly better off than we are.

World trade is important and every effort should be made for its development, but we can get along without it and we cannot afford to jeopardize our domestic activities for its sake.

The Tax Bill

WITH A BURST of unprecedented speed in the last days of the session, the revenue bill, designed to balance the budget, has been passed. It is not the best bill that might have been written, and it does not conform to the President's expressed wishes. But whatever its shortcomings, it is infinitely better than more weeks of wrangling and greater disturbance throughout the country. There is no denying that the tardiness of Congress in finishing this legislation has had a bad effect upon business.

When industry has had time to consider the bill in its entirety, it is more than probable that efforts will be made to revise it; that many of its provisions will work a real hardship upon industry. Therefore, we cannot with any degree of certainty consider the tax bill as a permanent measure. The next session of Congress will unquestionably find this subject one of its important pieces of business.

However, there is cause for rejoicing. The bill might have been much worse than it is, and it gives promise of meeting the thing for which it was designed—balancing the budget.

A Safe Bridge

AMONG the critics of our national tariff policy are many who expand the importance of world trade which they insist has been throttled by a tariff barrier which interferes with the free flow of international commerce. It is somewhat unfortunate that these arguments are not sustained by the figures on exports and imports. As a matter of fact world trade and domestic trade have decreased upon so similar a ratio as to make them ineffective.

All will agree that it is important that we shall have an outlet for about 10 percent of our normal production.

This is about the amount which our production exceeds our normal consumption. It does not follow that we cannot at the same time absorb a similar amount or even a greater amount of imports. During recent normal years our national income has been estimated at 80 billion dollars. This enormous earning power is able to absorb, in fact does absorb, the imports from foreign countries as well as to consume 90 percent of our domestic production. In addition to this the national wealth of the United States increased from 88 billions in 1900 to 423 billions in 1929.

It is difficult in the face of these figures to give much credence to the claims of those who insist that tariff barriers are fatal to our industrial growth.

Those Coal Hearings

A VAST amount of Congressional and important industrial leaders' time has been consumed during the past few weeks in arguing for and against the Davis-Kelly bill. If the coal industry had never before been investigated there might be some excuse for the present performance. But coal has been investigated. Many thousands of dollars have been spent in the process. It has been beleaguered by a commission. The Coal Commission and its attendant cost to the taxpayer is still a sore spot in our history.

And what is the purpose of these hearings and the huge expense involved? A commission! Nothing new about that suggestion. We have a number of them now, costing the government the rather magnificent sum of \$57,000,000 annually. We really do not need another.

A coal commission offers possibilities, however, in these days of unemployment. The bill authorizes five members at salaries of \$10,000, but anyone knows that that is just the beginning, as witness the Farm Board which started out with seven members and a salary list of \$72,000, but which last year employed 350 people with a total salary list of \$1,087,000, which, of course, does not include the expense of the commission!

Coal offers a fine political football. Leaders in Congress have taken full advantage of its wide political ramifications. Repeatedly members who should know better have vigorously "kicked the ball."

Aside from all that: just what precedent would such legislation set? Certainly it would open the door wide for the political regulation of every industry which deals in interstate commerce. It would develop a system of licensed industry that would vastly overshadow any evil that exists now in the competition within the field.

Coal should not be made an example. Its virtues far outweigh its weaknesses. And as it becomes conscious of its weaknesses, it is endeavoring to correct them. Give it time.

Time and Industrial Activity

by T. O. McGrath*



HAVING OBTAINED sufficient knowledge of the laws of nature to enable him to utilize natural forces of power to replace the brute power of man and beast, man has raised the standard of living of the mass, improved his methods of industry, finance and government, increased the knowledge and intelligence of the people and amassed enormous wealth in the hands of a few.

At the height of the greatest prosperity ever experienced in the United States, a change in the mass spirit from activity and hope to rest and fear occurred. Regardless of the efforts of the leaders of industry, finance and government, the changed attitude of the people has persisted and a major depression has settled over the whole nation, millions of men are unemployed and confidence is at a low ebb.

As the leaders of industry and finance in the United States would not believe in 1928 and 1929 that such a thing could happen with all the artificial safeguards that had been installed, the change in mass attitude caught business, banking and government unprepared. In their efforts to prolong the period of prosperity, the leaders have brought about conditions that threaten the structures which have been so laboriously built up in the past.

Man unwillingly discovers that his inventions and artificial systems will not maintain a mass attitude favorable to a continuous flow of positive and prosperous conditions; that a continuous increase in production and consumption cannot be indefinitely maintained. Instead the leaders find that there is a periodic expansion and contraction in the activities and emotions of the mass beyond their control and that there must be periods for digestion and assimilation as well as for production and consumption.

Men now realize that they do not know the times when changes in mass activity from positive to negative and back to positive occur.

It is now realized that the lack of knowledge of the time of change in the attitude of the mass spirit has largely offset the advantages of the material achievements and the artificial systems of men.

In fact the present forms of the artificial systems of men, built upon the utilization of natural forces and inventions have become so far out of line with the natural order of things, that, in the opinion of some authorities, they may not survive this major shrinkage

period which is nothing more than a repetition of a major rest period which has recurred at set intervals in the past.

It is now recognized by all thoughtful men that none of the past or present financial, industrial and governmental systems will produce ideal conditions, or even satisfactory conditions, for more than short periods of time; that all of the man-made devices and efforts will not prevent depressions, and that with all the improvements, inventions and increase in knowledge, there is still something more than the efforts of men involved in the rise and fall of mass activity known as the Business Cycle.

Men do not yet have clear concepts of what is the basis of wealth and how shall satisfactory conditions be maintained under the present systems of civilized society. Most men believe that the basis of wealth is money and that the past periodic recurrences of prosperity and depression are the result of weaknesses of human beings in their inability to save money and therefore, periods of rise and fall will continue in the future regardless of improvements in the artificial systems of men or a further increase in inventions and knowledge of material things.

The Business Cycle

STATISTICIANS have agreed that there is a business cycle of rise and fall of volume and price. They have divided the business cycle into four stages of Revival, Prosperity, Decline and Depression, making two phases of plus and minus, one above and one below a mean line. The two phases of rise and fall are the result of a rise from the necessity level to the limit of purchasing power and consumption and a fall back to the necessity level.

Such a division of the rise and fall of business volume and prices is no doubt as accurate a description of the movement of mass activity in business as can be put in four simple words.

The three dimensions of the business cycle are volume, price and time. An effort has been made to show that the time of the rise and fall of business volume and prices follows a sine curve as shown by Chart No. 1.

Some authorities have endeavored to demonstrate that the time each cycle is above and is below the mean or normal line approximates 40 months. While a

40 month cycle is a very common one in the movements of business in the past, such a time factor will not measure satisfactorily the rise and fall either of business activity, commodity prices or stock prices.

Economists and Statisticians realize that the time of the major trend cannot be determined from the factors that record volume and price. However, as no one has yet given out any Time Factors that can be used with confidence when anticipating future probabilities, the factors for volume and price have to be used as an aid to forecasting.

The great need for Time Factors and the unreliability of present factors in forecasting is acknowledged by statistical organizations. In the issue of the *Annalist* of November 27, 1931, in an article headed "Money in Circulation," it is stated:

"Unfortunately in this case, we run squarely into the fact that statistical analysis has its limitations."

The limitations of statistics have shown up not only in the compilations of money in circulation but in the use of interest rates, bond prices, steel production, etc., as a means of determining the general trend of business.

Present Theories of the Cause of Rise and Fall

WHILE MUCH HAS been published to explain the basis of the present industrial system and the cause of the rise and fall in business activity, nothing definite as to the cause of the major movements has been given out, and the present opinions and beliefs of business men and of the public as to the primary fundamentals of business are chaotic and uncertain. Very few have a clear concept of the primary factors involved in the present system of business.

There have been many theories advanced to explain the cause of the rise and fall in business activity and prices. All of the theories have been limited to the activities of men. None of them take into consideration time nor the activities of nature.

Until recently the most popular theory was:

1—That volume production and lowering of selling prices forced consumption of goods. It was

* Mining Statistician, Tucson, Arizona.

known that volume production reduced overhead costs. It was assumed that a reduction in selling prices when mass consumption began to decline would automatically stimulate consumption (especially if accompanied with the proper advertising), and an increased production volume and lower production costs would be obtained and prosperity maintained.

Until recently, the most unpopular theory was:

2—That consumption forced production and that consumption can be increased and prosperity maintained by an increase in compensation to the individual workers and an increase in the number of workers. The increase to the wage and salaried workers who constitute the bulk of the consuming mass to be either in more pay or reduced price of products.

The production and price theory that volume production would result in volume consumption has failed. The failure was due in part to the fact that increasing the volume of production did not proportionately increase buying power as a result of increased employment or compensation to workers who are the consumers.

However, the principal cause of failure was due to the fact that human beings can and do become satiated both with ideas and products and must have rest periods in which to digest and assimilate consumption.

The consumption theory that consumption and volume of compensation to workers regulate production has never had a thorough tryout.

The opposition to such a theory is very marked for the reason that those who are able to build up industries do not favor an increase in wages and salaries to employees much, if any, above the standards of the past. They contend that distributing an ever increasing amount of profit to the consumers would result in accumulated wealth passing into the hands of the mass and become wasted and dissipated.

As it is the greed, selfishness, vanity and follies of the wealthy that throw the present system out of balance, there is no reason to believe that the consuming mass would prevent the system from becoming unbalanced by being less greedy, selfish, vain and frivolous if given the same opportunities as is now enjoyed by the wealthy.

Prosperity is not necessarily a normal or healthy condition. The prosperity periods of the past have been the result of the mass struggle to obtain, possess and consume more than is necessary to satisfy human needs. The weaknesses of human beings bring the struggle to a climax. Depression follows the climax of the mass desire to obtain luxuries as the mass becomes willing to rest and to confine its wants to needs. The irritants of the necessity level of the depression periods result in the birth of another mass urge to rise above the pressure demands of necessity, and the cycle repeats.

It appears that the natural order is alternating periods of activity and rest, a rhythmic movement of rise and fall, of expansion and contraction. Such appears to be true whether the movement

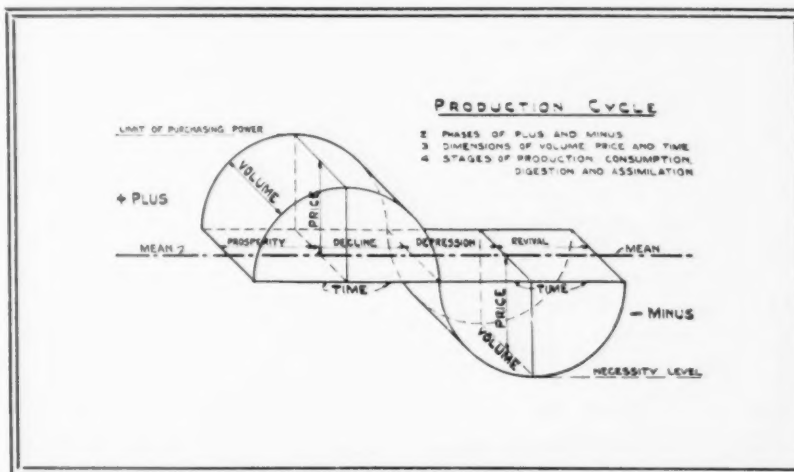
is that of an individual unit, or of an organized mass.

The principal reason that major rest periods in mass activity cause major depression periods in business is that the present industrial system is not built to provide for periods of mass inactivity other than those of the day and year.

Ex-President Coolidge has expressed it as his opinion that the present depression was the result of greed and

The Present Profit System

THE PRESENT SYSTEMS of government, industry and finance exalt and emphasize the acquisitive faculty of mankind. Regardless of the fact that the acquisitive faculty is not creative and that the accumulation of wealth does not create new wealth, the principal purpose of the present systems and civil laws is to assist and protect the accumulator of wealth. The problems of creating new wealth and the proper distribution and



selfishness. There can be no argument that greed and selfishness accentuated the intensity of the boom of 1928-29 and the present depression. However, even unselfish and the most generous persons must give way to periods of rest, must relax and sleep, at regular intervals.

Wealth

THE PRINCIPAL CAUSE of greed and selfishness is the desire for wealth. While money is accepted as wealth, its value and purchasing power depend upon the actual mental, moral and physical wealth of the mass and the integrity of the government.

A ton of gold, silver, iron, lead or copper ore has no value as ore to an uncivilized race that lacks the knowledge and the equipment to reduce the ores to bullion and to fabricate the metal into useful forms.

Neither has ore any great value to an intelligent and skilled race while the mineral is in the raw state in the ground. When the ore is mined and converted into the pure metal and the metal has been fabricated into useful products by the application of thought, art, science and labor, its potential value becomes real. Wealth has been created.

In other words, thought, art, science and labor must be applied to raw materials and forces to create wealth, develop intelligence, achieve happiness and obtain progress and prosperity. Money is a medium of exchange and a representation of the real wealth of the Government issuing the money. Money is the means by which the distribution and accumulation of wealth is accomplished.

The creation of wealth, its distribution, its accumulation and the use of accumulated wealth are separate and distinct problems.

circulation of wealth are considered of minor importance under the present profit system.

The accentuation of the importance of the accumulation of wealth has resulted in the past 40 years in the concentration of more than 75 percent of the wealth of the nation in the hands of approximately 5 percent of the population.

As the thinkers, the artists, the engineers, the inventors and the laborers are the creators of new wealth and rarely have the acquisitive faculty sufficiently developed to become accumulators of sufficient wealth to assure their independence, the passing of the control of industry and finance into the hands of the accumulators may bring about a stagnation in the creation of new wealth. In the past an abnormal concentration of wealth has brought either retrogression or revolution.

The economic confusion of the present time is due largely to the failure to recognize that cyclic law is cosmic and rules time and that the use of energy and knowledge by men to create and accumulate is governed not only by the law of action and reaction, but also by the cosmic laws of nature that measure the time of activity and rest.

The result of man's utilization of the law of action and reaction depends not only upon his skill and energy but also upon his knowledge of cosmic laws that rule time and to the degree that he harmonizes his activities with the positive and negative movements of nature. Therefore, his prosperity depends upon his ability to store and use energy, knowledge and accumulated wealth and the degree that he synchronizes his activities with those of nature.

It is evident that three of the deficiencies of the present system are:

1. A lack of knowledge of the cause of the change in mass spirit from positive to negative and back to positive.

2. A lack of preparation for the negative periods.

3. A lack of sufficient purchasing power in the mass to consume the normal production of our present industrial capacities and also prepare for the negative periods with savings from earnings.

Therefore, it would appear that the present systems must be changed so as to overcome these lacks if any real and lasting benefits are to be obtained for the mass and the present system be retained.

Under the present system there are three primary factors that determine the length, volume and range of each rise and fall:

1. The time that the cyclic periods of positive and negative begin and end which determine the time limits of each rise and fall.

2. The extent that the systems of government, industry and finance assist or hamper the desire and efforts of men to express the mass desire to action or reaction which regulates volume of activity.

3. The extent that those who control accumulated wealth furnish the mass and the leaders at the proper times with purchasing power in the form of money and credit which regulates the price range.

As has been proved the past several years, the most important of the three factors is the time movement.

Under the present industrial system, profit is the driving power that turns the industrial wheels of production and accumulated wealth is the goal. Therefore, the effort of accumulated capital is to endeavor to stabilize prices and to turn the major portion of earnings as dividends back to capital.

To stabilize prices, the amount distributed as salaries and wages has been set at fixed standards and when these standards fail to provide a total sum that will consume the industrial production at the desired profit, the deficiency in buying power is made up by extending credit until the load of debt becomes too large to be safe, when credit is withdrawn and the production stream allowed to decline.

As the volume of production shrinks, general curtailment raises the number of unemployed and further reduces the buying power which calls for still further curtailment and increase in unemployment and the decline runs into depression which lasts until all surplus stocks are consumed, both of goods and savings, and the industrial machinery is forced to resume production if the system is to persist.

The capital used to start a new cycle under the present system is accumulated in many ways. Five of the principal methods of accumulating capital for use in industry are:

1. The practice of economy and savings by individuals who loan their accumulations at interest.

2. The mass depositing small earnings and savings in banks and investment companies which is loaned at interest.

3. By inventions and improvements so that a product can be produced or a more efficient service can be performed at less cost than

by competitors and the extra profits carried as surplus.

4. By using saved capital to finance and develop natural resources of the earth and the forces of nature, giving a value to things that had not previously had a value.

5. By exploiting the weaknesses and follies of our fellows.

In starting up the industrial machinery, accumulated wealth, or capital, is used as follows:

1. Capital is invested in production equipment.

2. The equipment and additional capital to pay wages and salaries and to purchase raw materials and supplies is used to obtain a finished product.

3. The finished product is sold in competition with similar products to those who receive the wages and salaries and to those who received the payments for raw materials and supplies purchased (or to those who exist upon the expenditures of the workers and producers of materials).

4. The difference in the amount received from sales and the amount expended to produce the product sold, results either in a profit or a loss.

5. If a profit, the earnings are distributed to the owners of the venture as dividends or carried as a surplus.

6. If a loss, the amount is charged to surplus or to capital until a profit is obtained or the business is forced to cease operations.

As the demand for products is never uniform, the customary practice is to set aside a certain portion out of earnings, when obtained, as a surplus to be drawn on when profits can not be earned, so that fixed charges of taxes, insurance, etc., can be met during depression or inactive periods.

Under the present system of industry, when production can not be sold as produced, the cause therefore must be determined immediately, and the proper adjustment made if possible, otherwise the business is in danger.

The more that production exceeds sales the quicker the working capital becomes frozen and credit becomes exhausted and production activity forced to stop.

Therefore, the vital problem is to prevent over production and the tying up of the working capital in products that can not be sold. The time of the rise and fall in consumption demand must be anticipated.

If production is not sold, it is either the result of

1. Sufficient supply of a better or cheaper product from other sources;

2. Lack of demand on the part of the mass; or

3. Lack of ability to purchase on the part of the mass.

As the inefficient producer and the producer of an inferior product must eventually be eliminated, no consideration need be given such a cause for lack of demand in an effort to solve the reason for the major rise and fall in mass consumption of goods.

There are left only two possible causes

for a rise and fall in mass consumption of goods:

1. A rise and fall in the natural hunger of the mass for consumption and/or possession above necessity.

2. A rise and fall in the means necessary to purchase goods for consumption or possession as a result of possession or lack of possession of money or credit.

In the past the natural rise and fall in the hunger of the mass for consumption or possession above the needs of necessity has had a definite timing. The artificial systems of industry and finance have either assisted or hampered the normal expression of activity and rest and have raised or lowered the general level, but have not altered the time limit perceptibly.

Production operations must be regulated to conform with the natural rise and fall to the extent that financial means will permit, otherwise a crisis is precipitated.

A rise and fall in the ability of the mass to purchase and obtain credit is determined partly by the individual's ability and health, but largely by the artificial systems of finance, industry and government, and the ability and integrity of those in control of industry, finance and government.

A lack of the means to buy and/or obtain credit will slow down a prosperous period, accentuate a decline and weaken a revival but it will not submerge the mass desire to consume and possess. Likewise the furnishing of credit will not stimulate the desire of the mass to consume when the mass attitude becomes negative.

Production operations and financial activities should be such as to assist the natural movement in a constructive manner instead of endeavoring to crystallize the natural movement at a fixed level of price and volume.

The past several years have furnished convincing evidence that there is a natural movement of rise and fall and that it is the natural movement, when it is ignored, that upsets the most carefully laid plans of men and disrupts the most cleverly devised systems of finance, industry and government.

Defects of the Present System

THE PRINCIPAL WEAKNESS of the present system is lack of provision for the major rest periods and the assumption that prices and volume can be maintained at a fixed level.

While the present system has its defects, there is no assurance that any artificial system of government and industry built upon any other basis such as socialism or communism would be any more desirable or beneficial if the major rest periods were ignored.

Many of the weaknesses attributed to the present system are nothing more than the weaknesses of human nature and will appear in any system until human nature is changed.

Theoretically, the profit in a profit system is the penalty assessed the ignorant, lazy, inefficient, wasteful and foolish, and given to the saving and economical as an interest or rent for the use of their saved or accumulated capital, and given to the intelligent, inventive and skilled as a greater wage, salary or royalty.

(Continued on page 16)

Congress Session

Nearing Close

GOVERNMENTAL BUDGET BALANCING through imposition of new taxes amounting to \$1,118,500,000, and reduction of Federal expenses by several hundred million dollars, coupled with proposed legislation for relief of the unemployment situation, is keeping Congress busy on the eve of its early prospective adjournment late in June. Congress passed and the President approved the new tax bill on June 6, which imposes, effective June 21, taxes of 4 cents per pound on imported copper, 10 cents per 100 pounds on imported coal, 4 cents per gallon on domestic and imported lubricating oil, 1 cent per gallon on gasoline sold by importers or producers, 2½ cents per gallon on imported gasoline, half cent per gallon on imported crude, fuel and gas oil, 3 percent on domestic and commercial, but not industrial, consumption of electricity, 4 percent on the transportation of petroleum by pipeline, and 2 cents on each bank check presented for payment, to continue until June 30, 1934.

Under amended depletion sections of the tax bill, the 27½ percent allowance for oil and gas is continued, while sulphur is allowed 23 percent, metal mines 15 percent, and coal mines 5 percent of gross income, exclusive of rents or royalties paid or incurred by the taxpayer on the property, effective on income tax returns for 1932 to be made in March, 1933, with the option up to 1934 of either percentage, cost or March 1, 1913, value as a basis for depletion, but with the stipulation that the option exercised for the taxable year 1933 shall continue as the depletion basis thereafter. During the Senate Finance Committee consideration of the measure, the American Mining Congress submitted a brief, on behalf of its national tax committee, covering the depletion and other sections of the bill affecting the mining industry. The House passed a governmental economy bill for reductions of \$40,000,000 in Federal expenses, and the Senate is now considering the measure amended to save nearly \$200,000,000 more. Under this bill \$725,000 is expected to be saved through a system by which the Bureau of Mines and Standards will hereafter make charges for tests and investigations, increased patent fees, and charges by the Bureau of Foreign and Domestic Commerce for special statistical, commodity, technical and regional bulletins and periodical services, on schedules to be prepared by the directors of these bureaus. All Government bureaus have undergone drastic reductions in their appropriations for the year beginning July 1, 1932, the Geological Survey to the extent of \$2,181,000. Appropriations for the Bureau of Mines and Standards are still

in conference, that for the former being fixed at \$1,895,325 and for the latter at \$2,137,280, but subject to further action by Congress.

Congressional Action Summary

**COPPER, COAL and OIL Import
Taxes Effective June 21.**

**AMENDED MINE DEPLETION
Provisions.**

**CHARGES FOR BUREAU OF
Mines and Standard Tests.**

**INTERNATIONAL Tariff Con-
ference Vetoed.**

**DEPRECIATED CURRENCY Ef-
fect On Imports Heard.**

SEVERAL MINING Bills Enacted.

**WAIVER OF MINE Assessment
Work Voted.**

**COAL REGULATION Hearings
Concluded.**

**INTERNATIONAL Silver Con-
ference Again Recommended.**

**MUSCLE SHOALS BILL Passes
House.**

**COMMITTEE PROPOSES Immi-
gration Reduction.**

Tariff Proposals

TARIFF MEASURES have occupied the attention of Congress. It passed but the President vetoed a bill authorizing the President to initiate a movement for an international economic conference to lower the tariff and to permit Congress instead of the President to pass on tariff changes on reports of the Tariff Commission. As the House failed to pass the bill over the veto, it was laid aside. The Senate passed a resolution authorizing the commission and a special Senate com-

mittee to investigate the effect of depreciated foreign currencies on national and international trade and the House Ways and Means Committee, after hearings on proposed legislation to adjust tariff rates to meet the depreciated currency situation, rejected the proposal. At these hearings the American Mining Congress presented witnesses who advocated adjustments in behalf of American production of antimony and titanium ores. Several bills were introduced to exclude Russian goods.

Public Lands

CONGRESS FOUND TIME to act on a number of bills of interest to the mining industry. It passed and the President approved the following laws: Suspending assessment work on mining claims in the United States and Alaska for the year ending June 30, 1932; authorizing the Dakotas, Montana, and Washington to grant 20-year mineral leases to lands granted them on admission to the union; for a two-year extension of potash prospecting permits; giving title to the states to their school land grants when the Government revokes its reservations to such lands; authorizing leases of coal deposits on lands of the Choctaw and Chickasaw Indians in Oklahoma; to vacate withdrawals of public lands under the reclamation law and permit their development under the mineral land laws; and granting lands to Colorado for the benefit of its School of Mines.

The Senate passed and the House Public Lands Committee reported a bill to permit the use of an additional 160 or 320 acres of land by mineral lessees or permittees for use as refining works, mill, tipple or camp site, at an annual rental of 25 cents per acre. A three-year extension of oil and gas prospecting permits was provided in a bill reported by the Public Lands Committee of the House, and in the Senate a bill was presented to suspend annual acreage rentals during suspension of operations and production under the mineral leasing law in the interest of conservation either by direction of the Interior Department or the assent of lessees. Other bills introduced propose to authorize 20-year mineral leases to school land grants in Idaho; for stock raising homestead entries on oil or gas lands but not on naval oil and oil shale reserves, which bill was passed by the Senate; adding certain land to the Navajo Indian reservation in Utah but providing that 37½ percent of royalties from oil or gas produced thereon shall be allotted to Utah; and to encourage coal mining under competition

(Continued on page 16)

PRACTICAL OPERATING MEN'S DEPARTMENT METALS

Practical Operating Problems
of the Metal Mining Industry
GUY N. BJORGE, Editor

Tailing Disposal in the Tri-State Field

by R. J. Stroup*

THE EARLY SYSTEM of leasing land for mining purposes in the Tri-State field has resulted in the building of approximately three hundred tailing piles in the immediate Picher area. These vary in size from a few thousand tons to two million tons. The material is mainly flint, with some limestone and calcite and is all through a one-half-inch screen. Many of these piles have been restricted by land boundaries and surface improvements causing the disposal of this material to be a serious problem to the mine management. In one particular case, 1,105,000 tons of tailings were stacked on a rectangular tract of land 480 by 1,000 ft. This pile reached a maximum height of 240 ft. A high tailing elevator and four independent elevators were required to stack this pile.

There are only a few slight topographic features which may be taken to advantage in the disposal of tailings in this field. The use of these in the past has tended to retard the already sluggish drainage system of the flat prairie country and has caused flood waters after long hard rains to be serious problems.

Some plants are situated where water from mine drainage can be put into the ponds, others have to depend entirely upon small creeks and a few pump from deep wells. The last two systems require an additional expense and make it advisable to return as much water as possible to the mill pump circuit. Tailing piles are enclosed in earthen dams, which also include sufficient pond area to allow the fines to settle out and a clear water storage.

There are two methods used to elevate tailings onto the pile for disposal. The first is the dummy elevator system which is peculiar to this district. This consists of a system of independent elevators set on the slope of the pile, each discharging into the one higher up. The other system is by a single continuous conveyor. Each system has advantages and disadvantages of its own. These may be partially listed as follows:

Advantages of the elevator system:
Makes a disposal of all sizes of material.

Does not require additional dewatering nor wash water.

More satisfactory operation in cold weather.

Cheaper first cost at beginning of a mine operation.

* Engineering Department, Eagle Picher Lead Company.

Disadvantages of elevator system:

More power required.

Loss in elevation between units.

Higher upkeep cost.

Advantages of the conveyor system:

Lower power consumption.

Longer life of equipment.

Disadvantages of conveyor system:

Higher first cost.

Dewatering system and wash water required.

More difficult operation in cold weather.

Difficult to keep in alignment.

In an analysis of the areas and tonnages of 21 typical piles which were stacked by dummy elevators and containing from 50,000 to 1,000,000 tons, it was found that the average maximum tonnage per square foot of base area was 2.700; the minimum was 0.536 and the average was 1.328. Some conveyor stacked piles were found to run as high as 3.559 and a general average was much higher than for dummy stacked piles. This condition, however, was largely due to other conditions. The dummy stacked tailings as a rule contain the finer sized material and an excess of water which causes them to wash to a lower angle of repose.

Dummy elevators are of wooden construction and as a rule are independent motor driven. It has been found inadvisable to go to heights above 60 ft. or to belt widths above 24 in. Fifteen horsepower is required for such an elevator having a belt speed of 350 ft. per minute and driven by a single spur gear reduction to the head pulley. This is ample to handle 60 tons of material per hour. Eight-ply belts with sheet steel cups are used. Such a belt of standard brand will handle around 750,000 tons and would require four sets of cups.

The operating cost of a typical system with a tailing elevator and two dummies operating single shift is as follows:

	Cent per ton
Labor0054
Material and supplies.....	.0053
Power0076
Total0183

Material and supplies include only ordinary replacements and not new construction. To this figure should be added .0117 cents per ton for depreciation and bringing the total to .03 cents per ton.

Conveyors are either wood or steel construction and are housed. The average incline is 4 in. to the foot. Twenty to 24-in. belts are commonly used. Tailings are dewatered in a belt drag after coming from the jigs and placed on the belt. Belt speeds vary from 250 to 350 ft. per minute. The life of a belt is dependent upon the tonnage and also upon the alignment of the conveyor and method of loading.

The common practice is to pump the flotation tailings to the top of the conveyor and use this to wash down the coarser material. If this is not done it is necessary to pump clear water to the top of the pile for this purpose.

Laundry frames are built of wood and allow a fall of 1½ in. per foot for coarse tailings. Legs of the bents are formed by two 2 by 6 planks spiked in a T shape and the diagonal bracing is of the same material. Launder widths are the same as of standard dimension lumber, i. e., 6-in., 8-in., 10-in., and 12-in. These are then lined with cast iron spouting of a corresponding width. These have sides about 2 in. higher and are about three-quarters of an inch thick. A section 12 in. wide, 3 ft. long weighs approximately 60 pounds. The present price of this material is 2¼ cents per pound. Rubber liners have been tried and while they give good service the greater cost did not balance the increase in life.

Sheet steel spouting in sections 10 ft. long and with 3-in. sides is used on the tailing piles. These have a lip on one end for making a connection and are laid on the surface of the pile. With these, the tailing herder can direct the flow of tailings and shape the pile as conditions demand.

A large tonnage of tailings is loaded out from piles which are favorably situated. They are loaded into railroad cars with a drag scraper discharging onto a belt conveyor. Tailings are used for railroad ballast, road material and concrete construction. Some loading plants have screening devices to make commercial sizes. Tailings as a rule revert to the land owner. The average price received by him for this material is \$2 per car.

New Steel

The Union Carbide and Carbon research laboratories have developed a new steel containing chromium and vanadium.

Labor Costs and Machine Costs

by G. B. Southward

THE AVERAGE sales price of coal at the mines has declined nearly 50 percent during the past 10 years. This figure applies to all of the coal produced in the United States and does not represent the exact decline in each field or for each kind of coal mined. In some instances the reduction in the market price has been greater than this average. It may be that influences which are now at work will restore some of the price loss but the amount of the increase and when this will be put into effect are entirely matters of conjecture at the present time. It is equally probable that the competition from other sources of fuel or the potential overproduction of coal will combine to offset any of the measures which may be taken to raise the sales price.

So, it is well for the coal operator to face the possibility that the market situation of today may represent the approximate level which will be maintained in the future. At any rate, it would seem the part of wisdom for a mine to adjust its operation to meet present conditions, and if these can be successfully met, the mine would profit to a still greater degree by any improvement in the selling price which may occur later.

The operating methods and the production costs which apply in coal mining today were developed to supply a market which no longer exists. Compared to past conditions, the purchaser's dollar today will buy more coal than it used to. It therefore follows that the dollar spent by the operator must be made to produce more coal than it did. In fact, unless the industry goes into bankruptcy, a dollar must produce a greater amount of coal than a dollar will purchase. It does not require very deep or profound thinking to arrive at this conclusion, but it will require some deep thought and hard work to bring about the proper adjustment in actual mining.

This adjustment does not necessarily imply lower wages—in some fields today the wage scale may be too high but in others it is certainly too low. But it does imply lower wages unless the present productive rate of men employed can be increased. Coal mining today has developed a high efficiency in its performance by hand methods but we know that these have about reached their limit and their mining under present market conditions has not and can not be made profitable. So machine methods are the only answer and mechanization the real hope for the future.

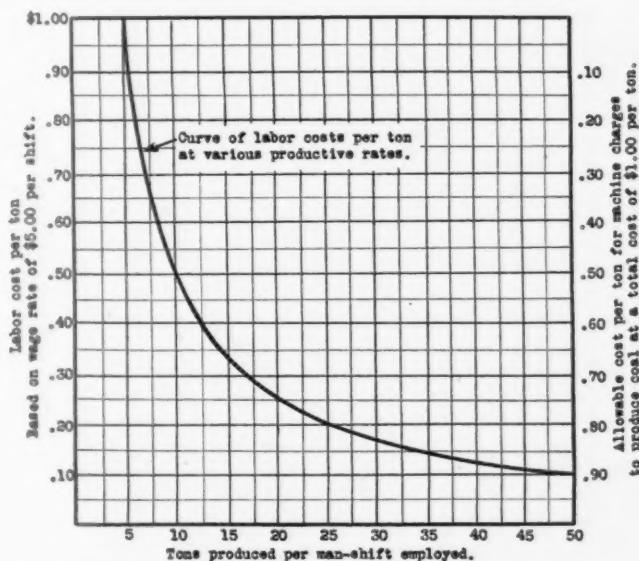
Production costs with machines include wages paid to men employed and money spent for purchase and maintenance of the equipment. In order, therefore, for a machine to be economical, the money paid to the men who operate it, together with the money required for its investment charges and maintenance, must pro-

duce more coal than the same amount of money paid for a hand operation. So the real problem of adjustment is to determine what is the best way to divide the money spent for the total cost of mining between the items of labor and machine charges—to supplement labor with machines in the proper proportion so that their combined costs will produce coal at a profit that can be participated in by both labor and capital.

which may be added to the labor cost to cover the purchase of equipment for increasing the productive rate of the men.

For example, if the tonnage rate is increased from 5 to 10 tons per man, the curve shows that the labor cost will be reduced from \$1 to 50 cents per ton. This point on the curve also shows that there would be an allowable margin of 50 cents per ton for the machine charges. "Machine charges" in this case are meant

Curve Showing
DECREASED LABOR COSTS by INCREASING TONNAGE PER MAN
and
ALLOWABLE MARGIN for MACHINE INVESTMENT and MAINTENANCE CHARGES.



The curve submitted with this article is designed to show, theoretically, how the labor cost of mining coal is reduced by increasing the productive rate of the men employed and maintaining the same wage scale. This graph is started on the assumption that a rate of \$5 per shift is paid for a production of five tons per man. This gives a base cost of \$1 per ton and may be taken to include all of the operations from the face to the tipple, or may represent any portion of these operations.

Starting on the above basis, the curve then shows how the cost per ton for the labor will decrease as the production per man is increased according to the tonnages shown at the bottom of the chart. The figures at the left-hand side of the curve show the labor costs per ton (decreasing from \$1 at the top) while the figures on the right-hand side of the curve show the margin which can be allowed for machine charges (per ton)

to include the interest on the investment, depreciation, maintenance and a fair return for profit. They also include additional power cost and any extra charges which may be caused in the other operations of mining. For instance, for loading machines this margin would have to include such items as the increased cost for the track work and probably some additional cost for cleaning coal at the tipple.

This curve may be theoretical in that it does not show results obtained in any mine. But a portion of the curve does represent actual performances as there are mines which have mechanized and have increased production from 5 to 10 tons per man. When we know that very few machines now used underground for cutting, loading or haulage are producing their capacity, we can realize the possibilities for reduced costs in a completely mechanized and balanced operation.

PRACTICAL OPERATING MEN'S DEPARTMENT

COAL

Practical Operating Problems of the
Coal Mining Industry

NEWELL G. ALFORD, Editor

Reducing Haulage Costs Thru Proper Application of Bearings

by S. M. Weckstein*

IT IS A well known fact that coal mining is largely a matter of transportation. The mine car is therefore the important link in the successful operation of mining enterprises. As such, full consideration should be given to the design and efficiency of the running gear of the car. Anti-friction bearings and especially tapered roller bearings have played an important part in reducing costs by effecting the following advantages:

EASIER RUNNING: Cars equipped with tapered roller bearings are easier to start and easier to keep at high speeds which assures hauling of longer trains and more trains in a given time. This naturally means that greater tonnage can be removed from the mines.

LOWER POWER COSTS: Tests have very definitely shown that the draw bar pull per ton in starting for a tapered roller bearing car is about one-seventh that for a plain bearing car. This means that smaller locomotives can be used for hauling long trains.

LESS LUBRICANT: Tapered roller bearing equipped cars require lubrication every six months or once a year, due to proper design of enclosures which keep lubricant in and dirt out of bearings. This means savings in cost of lubricant and labor of lubrication.

LONG LIFE—LOW MAINTENANCE: Properly designed roller bearings operating in a bath of lubricant reduce wear to a minimum and assure long life of running gear. The absence of bearing and axle wear limits the life of the car to the life of the wheel tread. The reduction in repairs and repair men effect large savings.

STANDARDIZATION: The development of a standard line of mine car bearing recommendations as shown in Fig. 1 (J-801-E-2700) insuring interchangeability of parts has greatly appealed to both manufacturers and operators and has produced marked savings.

A very interesting survey has recently been made by a large coal operator to

compare the cost of operation when using plain bearing cars and Timken tapered roller bearing equipped cars. The following is a summary of the results obtained:

	Maximum Plain Brg.	Timken
Cars per train.....	25	40
Tons per train.....	96.5	154.4
Costs per train:		
Fixed charges.....	\$2.83	\$3.91
Lubrication.....	.33	.07
Car maintenance.....	1.53	.38
Track maintenance.....	.32
Crew labor.....	1.20	1.20
Totals, less power...	\$6.21	\$5.56
Cost per ton.....	\$0.064	\$0.036
Saving per ton.....	0.028
Percent saving.....	44%
Cost per ton miles....	\$0.021	\$0.012

The equipment in the above survey consisted of steel and wood construction 10-

It was impossible to obtain a comparison on power costs. It is known, however, that the Timken cars required much less power. Under identical grade conditions the same 15-ton locomotive was capable of starting and hauling a 40-car train, while on plain bearings the maximum train included only 25 cars. A further indication of the saving in power is shown from the fact that a small motor was taxed to the limit in pulling a 30-car plain bearing train up the dog line running to the tippie. The same motor easily pulls 60 Timken cars up the same track.

Under normal conditions all Timken cars are lubricated every six months. Each car requires an average of 2.25 pounds of lubricant per greasing. Approximately 450 cars are lubricated within 2 days. One man on each side of the track lubricates the wheels as the cars return from the tippie.

With plain bearings two men were required to work full time and to lubricate each car once every round trip. Even with this precaution it was found necessary to replace approximately 100 wheels per month. Over a period of four years no Timken bearing has ever been replaced because of failure in this mine.

To sum up, this survey clearly indicates that with the use of Timken bear-

LINE NO.	MAXIMUM LOAD ALLOWED IN FOUR WHEELS IN POUNDS	DRAWING NUMBER SHOWING APPLICATION	TAPERED ROLLER BEARINGS				STEEL DUST COLLAR				STEEL WASHER				ADJUSTING NUT				COTTER PIN		AXLE		WHEELS				TOTAL WEIGHT OF TIMKEN PARTS PER CAR
			FURNISHED BY THE TIMKEN ROLLER BEARING CO.				ALL DUST COLLARS 1" THICK FURNISHED BY THE TIMKEN R.B. CO. DRAWING NO. C-6203				ALL WASHERS 1" THICK FURNISHED BY THE TIMKEN R.B. CO. DRAWING NO. C-6126				ALL NUTS 12 USF THREADS PER INCH. FURNISHED BY THE TIMKEN R.B. CO. DRAWING NO. C-6132				ALL COTTER PINS FURNISHED BY THE TIMKEN R.B. CO. DRAWING NO. C-6138		SEE NOTE NO. 3		GENERAL DIMENSIONS				
			BEARING NO.	BEARING DIMENSIONS	BORE (INCHES)	OUTER DIA. (INCHES)	PART NUMBER	SIZE (INCHES)	PART NUMBER	SIZE (INCHES)	PART NUMBER	SIZE (INCHES)	PART NUMBER	SIZE (INCHES)	A	B	C	D	E	F	G	H	WEIGHT (POUNDS)				
1	5,000	E-2704-F	2704	2704	1.500	3.000	K-3001	2.378	K-6125	2.378	K-8110	1 1/2	K-8111	1 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	17				
2	6,000	E-2702-F	2702	2702	1.750	3.250	K-3002	2.378	K-6125	2.378	K-8110	1 1/2	K-8111	1 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	21				
3	7,000	E-2703-F	2703	2703	2.000	3.500	K-3003	2.378	K-6125	2.378	K-8110	1 1/2	K-8111	1 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	27				
4	8,000	E-2704-F	2704	2704	2.250	3.750	K-3004	2.378	K-6125	2.378	K-8110	1 1/2	K-8111	1 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	31				
5	10,000	E-2705-F	2705	2705	2.500	4.000	K-3005	2.378	K-6125	2.378	K-8110	1 1/2	K-8111	1 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	36				
6	12,000	E-2706-F	2706	2706	2.750	4.250	K-3006	2.378	K-6125	2.378	K-8110	1 1/2	K-8111	1 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	42				
7	15,000	E-2707-F	2707	2707	3.000	4.500	K-3007	2.378	K-6125	2.378	K-8110	1 1/2	K-8111	1 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	53				
8	18,000	E-2708-F	2708	2708	3.250	4.750	K-3008	2.378	K-6125	2.378	K-8110	1 1/2	K-8111	1 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	61				
9	20,000	E-2709-F	2709	2709	3.500	5.000	K-3009	2.378	K-6125	2.378	K-8110	1 1/2	K-8111	1 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	67				
10	22,000	E-2710-F	2710	2710	3.750	5.250	K-3010	2.378	K-6125	2.378	K-8110	1 1/2	K-8111	1 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	73				
11	24,000	E-2711-F	2711	2711	4.000	5.500	K-3011	2.378	K-6125	2.378	K-8110	1 1/2	K-8111	1 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	80				
12	26,000	E-2712-F	2712	2712	4.250	5.750	K-3012	2.378	K-6125	2.378	K-8110	1 1/2	K-8111	1 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	87				
13	28,000	E-2713-F	2713	2713	4.500	6.000	K-3013	2.378	K-6125	2.378	K-8110	1 1/2	K-8111	1 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	94				
14	30,000	E-2714-F	2714	2714	4.750	6.250	K-3014	2.378	K-6125	2.378	K-8110	1 1/2	K-8111	1 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	101				
15	32,000	E-2715-F	2715	2715	5.000	6.500	K-3015	2.378	K-6125	2.378	K-8110	1 1/2	K-8111	1 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	108				
16	34,000	E-2716-F	2716	2716	5.250	6.750	K-3016	2.378	K-6125	2.378	K-8110	1 1/2	K-8111	1 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	115				
17	36,000	E-2717-F	2717	2717	5.500	7.000	K-3017	2.378	K-6125	2.378	K-8110	1 1/2	K-8111	1 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	1 1/2	2 1/2	122				

FIG. 200

THE TIMKEN ROLLER BEARING CO. FOR THE APPLICATION OF TAPERED ROLLER BEARINGS TO THE WHEELS OF PLAIN CARS OF VARIOUS CAPACITIES DESIGNED TO OPERATE ON ANY SPECIFIED GAUGE OF TRACK.

ft. cars weighing 11,600 pounds with load. Eighteen inch diameter wheels fitted with Timken tapered roller bearings on a 2 1/2-in. diameter axles were used in comparison with plain bearing cars of same size and capacity. All track in the mine was of standard 4 ft. 8 1/2 in. gauge using 60-pound rail on the main haulage road. The maximum grade against the load was 3.5 percent. Fifteen-ton electric locomotives were used on the main haul which averages 3 miles in length. All cars average one round trip daily.

ings in place of plain bearings the following advantages were obtained:

1. Increased tonnage of coal handled per train by 60 percent.
2. Reduced car lubrication costs 79 percent.
3. Reduced car maintenance costs 75 percent.
4. Reduced track maintenance (due to wrecks) practically 100 percent.
5. Reduced power consumption per ton of coal hauled.

* Industrial Engineer, Timken Roller Bearing Company.

NEWS

of the mining field

Personals—

J. F. CALBREATH will leave Washington about June 27 for an extended trip through the mineral producing districts, in the interest of the American Mining Congress, of which he is secretary.

MR. WINSLOW SAMPSON, for many years associated with S. K. F. Industries, has just been appointed the Pittsburgh district manager of the Kron Co., general offices and works Bridgeport, Conn. The Kron Co. manufactures a complete line of industrial scales. The Pittsburgh offices will be located at 302 Penn Avenue.

NORTH C. SHAVER, for the past 10 years sales manager for Penn Machine Company, Johnstown, Pa., has been appointed vice president and general manager with headquarters at Johnstown. The company maintains sales office in Pittsburgh, and sales office and warehouse in Huntington, W. Va., and is an important factor in the mine replacement parts business throughout Pennsylvania, West Virginia, and Kentucky.

GEORGE J. ANDERSON, retiring president of Consolidation Coal Company, was tendered a special dinner by his associates in the company, when they presented to him evidence of their affection and regard in the form of a testimonial, engraved upon parchment. They also presented him with a wrist watch.

SCOTT TURNER, Director of the Bureau of Mines and president of the American Institute of Mining and Metallurgical Engineers, recently received the honorary degree of Doctor of Engineering from the Michigan College of Mines, and delivered the graduation address to the outgoing class, at Houghton.

G. B. SOUTHWARD, mechanization engineer, the American Mining Congress, is visiting the various coal districts, gathering data for the use of the Coal Division. His trip includes the anthracite field, as well as all of the important bituminous fields.

JOHN D. RYAN, Anaconda Copper Company, appeared before the Senate Committee on Banking and Currency during its investigation of the Stock Exchange activities.

C. F. KELLEY, Anaconda Copper Company, was in Washington during the month, in connection with the hearings being conducted by the Senate Banking and Currency Committee.

THE UNITED STATES BUREAU OF MINES awarded the Windsor Power House Company a certificate for its fine safety operations. The mine operated with an average of 450 employees in the last four months of 1930 and the first nine months of 1931 without a lost-time accident.

COAL CONVENTION PROCEEDINGS ISSUE

The special edition of The Mining Congress Journal, carrying the complete program of the Ninth Annual Convention of Practical Coal Operating Men, and the National Exposition of Coal Mining Equipment, as presented to the recent Cincinnati meeting, will be ready for distribution about June 26. This number, in addition to carrying all of the papers presented, and the discussion following, will present a complete review of the Exposition, and full details concerning the convention. Copies will be distributed free, and if our readers wish this number sent to their friends, we will gladly furnish copies upon receipt of request.

THOMAS MOSES, president of the H. C. Frick Coke Company, was the principal speaker at the annual banquet of the mining classes receiving instruction under the Maryland Bureau of Mines.

J. W. ALLEN, Inspiration Consolidated Copper Company, was in Washington in connection with revenue matters, attending a conference at the offices of the American Mining Congress.

THE ANTHRACITE INSTITUTE, General Brice P. Disque, director, has moved its headquarters from 90 West Street to the thirty-second floor, 19 Rector Street, New York City.

TRUAX TRAEER COAL COMPANY has removed its general offices from Chicago to First National-Soo Line Building, Minneapolis, Minn. Chicago headquarters will be maintained in the Bell Building.

GEORGE H. CROSBY, of Duluth, Minn., has returned to his home after spending several weeks in Washington.

R. C. ALLEN, Ogleby Norton & Company, Cleveland, Ohio, was a recent Washington visitor.

Illinois Mining Institute Summer Meeting

The annual summer meeting and boat trip of the Illinois Mining Institute was held June 10-11-12. An interesting program was presented, under the direction of Mr. G. C. McFadden, who did such splendid work in connection with his chairmanship of the American Mining Congress' annual Cincinnati convention and exposition. Topics discussed included mining laws in Illinois and other states; safety, and mine timbering.

Lee Long Heads Association

At the recent annual meeting of the Virginia Coal Operators' Association, Lee Long, Dante, Va., vice president, Clinchfield Coal Corporation, was elected president for the ensuing year. The newly elected vice president is R. S. Graham, Norton, Va., vice president, Wise Coal & Coke Company. The board of directors of the association is composed of Lee Long; R. S. Graham; James B. Fleming, president, Robert Fleming & Company, Norton, Va.; D. D. Hull, Jr., president, Virginia Iron, Coal & Coke Company, Roanoke, Va.; J. L. Osler, general manager, Blackwood Coal & Coke Company, Blackwood, Va.; C. E. Ralston, general manager, Benedict Coal Corporation, St. Charles, Va.; J. D. Rogers, general manager, Stonegap Coal & Coal Company, Big Stone Gap, Va.; George J. Walker, general manager, Banner Raven Coal Corporation, Drill, Va.; and W. H. Sienknecht, vice president, Blue Diamond Coal Company, Middlesboro, Ky. C. B. Neel was re-elected secretary and treasurer.

Rocky Mountain Coal Institute Meets

The annual meeting of the Rocky Mountain Coal Mining Institute will be held at Salt Lake City, June 27-28-29. A program of special interest has been arranged, including discussions of "Safety and Accident Prevention"; "Economies in Operation"; "Safety Awards by the Bureau of Mines"; "Safety Appliances as Aid to Cost Reduction in Accidents"; Electric Haulage"; "Power Economies"; "Shaking Conveyors"; "The Future of Coal"; "Markets, Stokers, etc." Officers will be elected, and other business of the association is to come before the meeting.

TIME AND INDUSTRIAL ACTIVITY

(Continued from page 10)

The amount necessary to pay the interest return to those who have saved capital and to pay the higher wage, salary or royalty to intelligence and skill is obtained by adding a certain percentage to the cost of the product to be sold to get the selling price, and this added sum above cost is contributed by the consumer when he purchases the product.

Under the present competitive system the profit above cost can not be large except to the exceptionally efficient and skilled. The inefficient can not obtain a profit above cost because competition eliminates the inefficient.

The weakness of the profit or capitalistic system is the tendency of those who obtain control of government, finance and industry to exploit the weaknesses of their fellows for greater profits than should be taken, and by the use of graft, dishonesty and monopoly to allow inefficient units to operate at a profit and to load the mass and industry with excessive taxation to cover up waste, inefficiency and extravagance. Under the present system wealth tends to concentrate in few hands and no preparations are made to provide the necessities of life to the mass during the rest periods.

The decrease in the amount of wealth in circulation, or in the possession of the mass eventually reaches a point where the purchasing power of the mass is not sufficient to consume the volume of products that the machinery of production can produce and must produce to make the desired profit for the owners of the production machinery.

The present enormous overproduction was the result of the inability of the mass to purchase and consume the output in 1928 and 1929 even with the high wages and the liberal credit schemes that were in force in those years. Since 1929 the desire of the mass has declined more rapidly than production output was curtailed. Therefore, the excessive stocks of 1928-29 in many cases have been increased even into 1932.

While it is true that the mass can not express its desire for goods in actual purchases except as means are provided to enable a free and full expression of the desire to consume and possess, to be active and inactive, the great need is a knowledge of the time periods when the mass desire for goods rises and falls so that proper provisions can be made in advance.

It is true that the present systems of finance, industry and government in the United States have been perverted and can be immensely improved. However, it is not probable that any improvement will be made except as the ideals and the moral level of the mass is raised.

It is doubtful that any stabilized system of price and volume will be achieved by man for the reason that such a system is contrary to nature. The inactive periods are as essential to the normal health of the mass as are the active periods. The records of the past prove that no artificial means or system can prolong the active periods beyond their time limits so as to eliminate the inactive periods. Artificial heating has not eliminated the cold of the winter seasons, nor has artificial lighting eliminated the darkness of night time. It would not be to the best interests of the race or

nation to endeavor to maintain a continuous period of uniform activity without periodic rest periods.

WITHOUT DOUBT, until the ideal state shall be achieved, men will continue to swing back and forth on the pendulum of action and reaction, spurred on to action by the desires to excel, to possess and for gain, and reap rewards according to their own intelligence and efforts and to the degree that they time their efforts in harmony with the cyclic activities of nature.

The events of the past several years prove that the present industrial system is very much out of step with the natural order of nature and that men must learn to time their activities to harmonize with the activities of nature. To do so will require certain adjustments in the present systems of industry and finance.

The extent that men will be able to make the necessary adjustments and to prepare in the future for the minor and major rest periods will depend upon their willingness to do so and of their knowledge of the times when the natural periods of activity and rest begin and end.

Iron and Steel Industry in 1931

According to advance figures by the Bureau of Mines, the production of steel decreased from 40,699,483 gross tons in 1930 to about 25,600,000 tons in 1931. The decreased needs of the steel industry were naturally reflected in the outputs of pig iron, ferro-alloys, and iron ore, the production of pig iron declining from 31,036,866 tons in 1930 to 17,952,613 tons in 1931, ferro-alloys declining from 732,518 tons in 1930 to 466,969 tons in 1931, and iron ore declining from 58,408,664 tons in 1930 to 31,131,502 tons in 1931.

The figures on production of iron ore in Alabama, Georgia, Missouri, New Jersey, New York, North Carolina, Virginia, Washington, and Wisconsin were collected in cooperation with the State Geological Surveys, and the figures for pig iron in Michigan were collected in cooperation with the Michigan Geological Survey.

IRON ORE.—The iron ore mined in the United States in 1931 amounted to 31,131,502 gross tons, a decrease of 47 percent as compared with 1930. Compared with the average for the preceding five years, the production in 1931 is smaller by 52 percent. The shipments of iron ore in 1931 amounted to 28,516,032 gross tons, valued at \$74,123,910, a decrease of 48 percent in quantity and of 49 percent in total value, as compared with 1930. The average value per ton of iron ore at the mines in 1931 was \$2.60, as compared with \$2.64 in 1930. The stocks of iron ore at mines at the end of 1931 amounted to 13,063,708 gross tons, an increase of 26 percent. The stocks at the end of 1931 were about 3,800,000 tons above the average for the preceding five years. Final figures will be available shortly.

Iowa Coal Conference

The first Iowa Coal Conference was held at Des Moines, Iowa, June 16-18. Other associations cooperating in the conference were the State Association of Power Engineers, Iowa State College, the Allied Supplies Company, and the Iowa Coal Institute.

CONGRESS SESSION NEARING CLOSE

(Continued from page 11)

in Alaska by directing the Alaskan Railroad to purchase coal for its operation from one or more operating companies adjacent to the road. A resolution was passed by the Senate appropriating \$85,000 for the expenses of an International Geological Congress which will be held in Washington, D. C., in 1933.

Passage was given by the House to a bill to lease the Muscle Shoals, Ala., nitrate and power project or its operation by the Government if not leased within 18 months.

Consolidation Coal Co. Receivers Appointed

Receivers have been appointed for the Consolidation Coal Co. by the United States District Court. The receivers were directed by court order to continue the business of the corporation.

The receivers appointed are Howell Fisher, of Baltimore; Robert C. Hill, of New York; and F. R. Lyon, of Fairmont, W. Va.

The appointment of receivers followed the filing of an answer by the company joining in the request for the appointment of receivers.

The application for receivers states that the Consolidation Coal Co. was originally organized in 1860 and that it is one of the largest producers of bituminous coal in the country. It is incorporated in Maryland.

Obituary—

Joseph D. Zook

The sudden death of Joseph Dudley Zook, president and commissioner of the Illinois Coal Operators Association, on May 28, came as a great shock to his many friends and associates. Mr. Zook, who was but 47 years old, had established an enviable place for himself as a leader in bituminous coal affairs, for although his services were confined to the Illinois field, his influence was almost industry-wide.

Mr. Zook was originally a railroad man, coming to the coal industry through the forming of the Nason Coal Company, with which company he was affiliated for several years, joining the staff of the O'Gara Coal Company as general manager in 1926. He remained in that position until the creation of the Illinois Coal Operators Association, when he was chosen for the very important position of president and commissioner. Unquestionably the heavy duties which this post entailed hastened his untimely end.

He was very active in all affairs of importance to coal, and was a member of and took an active interest in the work of the American Mining Congress, the Illinois Coal Institute, the National Coal Association, and other organizations serving the industry.

He leaves a wife, Mrs. Louise Zook; and two children, Josephine and Joseph, Jr.; and hundreds of friends to mourn their loss.

With the MANUFACTURERS

Another Type of Switchgear Adapted to Outdoor Service

Moderate duty metal-clad switchgear using oil circuit breakers of oil-blast construction has been applied to outdoor service by the General Electric Company. This equipment can be used economically in many new installations where no building has been provided to house such apparatus or in existing installations where, because of underestimated load increases, additional space indoors is not available.

Oxweld Prices Reduced

The Linde Air Products Company, 30 East Forty-second Street, New York, N. Y., announces that substantial reductions in the prices of Oxweld welding and cutting blowpipes are now in effect. One of the major items of apparatus affected by this change is the Oxweld Type W-17 welding blowpipe. The Type CW-17 cutting attachment, the price of which has also been reduced, attaches directly to the W-17 handle and provides a means of cutting steel up to 3 in. in thickness. Along with other price reductions in Oxweld blowpipes, the Oxweld Type C-14 cutting blowpipe is being offered at a new low price.

New Duoweld Rail Bond Employs Flash-Butt Weld Manufacturing Process



A new line of rail bonds, manufactured by the electric flash-butt weld process, has recently been placed on the market by the Ohio Brass Company, Mansfield, Ohio. These bonds are known as the O-B Duoweld line.

The Mining Safety Device Company, Bowerston, Ohio, announce their new General Catalog No. 2, on Mine Car Dumping and Control Devices. Copy may be obtained free upon request.

Roberts & Schaefer Company has been appointed as exclusive agent to design and build complete coal bloxing plants for $\frac{3}{4}$ x 0 slack coal, using the Kleen-Blox Process.

In describing the process Mr. J. J. Davidson, manager, Car Dumper Department, Roberts and Schaefer, says:

"The Kleen-Blox Process has been used successfully in two plants: one at Council Bluffs, Iowa, operated by the Glen Smith Fuel Company, of Omaha, Nebr., devoted to making blox of $\frac{3}{4}$ x 0 petroleum coke screenings and has been in operation for two years; the other plant, located at Tahoma, Okla., and operated by the Tahoma Coal Company, makes blox from semi-anthracite $\frac{3}{4}$ x 0.

"The Kleen-Blox Process requires a small plant at a moderate cost, and the machinery is very simple and can be operated by ordinary labor. The amount of binder used is about one-half of that used in the large, expensive briquetting plants, but is sufficient to make a block which will stand handling and shipping with a minimum amount of degradation."

A revised map of the coal mining region in the mountains of southwestern West Virginia has been issued by the Geological Survey.

Save TIPPLE COST with HOLMES CAR RETARDERS



Fully enclosed, very inexpensive, with large rope capacity and quick rewind, HOLMES CAR RETARDERS give complete car control without the need of chucks, brakes, or extra men.

Send for
Bulletin No. 52

Robt. Holmes & Bros., Inc.
DANVILLE, ILL.

DIAMOND CORE DRILLING CONTRACTORS

We make Borings for Coal, Clays and all Minerals.
Up-to-date Equipment. Gasolene, Steam and Electric
Outfits. Ask us for estimates.

MOTT CORE DRILLING COMPANY
HUNTINGTON, W. VA.



We Look Into the Earth

By using Diamond Core Drills.
We prospect Coal and Mineral
Lands in any part of North or
South America.

Pennsylvania Drilling Co.
Pittsburgh, Pa.
Drilling Contractors

Stonehouse
SIGNS, INC.
STONEHOUSE BLDG 642 LAMBERT ST. INDEPENDENCE, MO.

Stock and Special Signs, Codes, Etc., for Mines

INDEX TO ADVERTISERS

Connellsville Mfg. & Mine Supply Co.....	16	Mine Safety Appliances Co.....	Back Cover
Deister Concentrator Co., The.....	16	Mott Core Drilling Co.....	15
Electric Controller & Mfg. Co., The.....	4	Pennsylvania Drilling Co.....	15
Ensign-Bickford Co., The.....	16	Phelps Dodge Corp.....	16
Hercules Powder Co.....	4	Roebbing's Sons Co., John A.....	5
Holmes & Bros., Robt., Inc.....	15	Stonehouse Signs.....	15
Joy Manufacturing Co.....	3	Universal Vibrating Screen Co.....	16

Phelps Dodge Corporation

40 WALL STREET

NEW YORK

MEMBER COPPER & BRASS RESEARCH ASSOCIATION

COPPER



The PIONEER and LEADER

of Successful COAL WASHING TABLES

The performance of Deister-Overstrom Diagonal-Deck Coal Washing tables has never been equalled. Over half a thousand treating Pennsylvania anthracite.

**The DEISTER
CONCENTRATOR
COMPANY**

Incorporated 1906
917 Glasgow Ave., Ft. Wayne, Ind.



CONNELLVILLE mine fans

Connellsville mine fan wheels are rigidly constructed and run in perfect balance. Electrically welded blades are shaped and set to give highest efficiency. Drives are belt, chain, rope or direct connection. Fans are built to meet any requirements and are of exhaust, blowing or reversible types.

Connellsville Fans combine high efficiency and sturdy construction with low installation and maintenance costs. Let us send further information.

THE CONNELLVILLE MFG. & MINE SUPPLY CO.
CONNELLVILLE, PENNSYLVANIA

UNIVERSALS
are



MONEY
MAKERS
Why?*

*The new Catalog No. 99
explains in full detail.

UNIVERSAL VIBRATING SCREEN CO.

RACINE - WISCONSIN

SAFETY IS THE SIGN OF SKILL

**CORDEAU
DETONATING FUSE
BICKFORD**

THE ENSIGN-BICKFORD CO.
SIMSBURY, CONN. U.S.A. Since 1836

Coal Men—Attention!

This Year's
**COAL CONVENTION
PAPERS**

will appear *Exclusively* in the

**CONVENTION
▪ PROCEEDINGS ▪
NUMBER**

of the

MINING CONGRESS JOURNAL

The Papers presented and discussed each year at the American Mining Congress NATIONAL COAL CONVENTION constitute, as a group, the most advanced Coal Mining practice to date. They form the finest current reference work obtainable on the subject of Coal Mining. They are practical, useful, and of utmost value to every practical Coal Operating Man. They will be FREE as usual, but will be obtainable ONLY in the special CONVENTION PROCEEDINGS NUMBER of the Mining Congress Journal, which will be ready June 30.



THINGS THAT CAN HAPPEN IN YOUR MINE!

Meet
JAMES MURRAY
employed at
No. 4 Mine
UNION PACIFIC COAL CO.
Rock Springs, Wyo.



On last October 30th, "Jim" was standing at the end of his car loading it, when crash ...! Look what hit him.



Jim owes his life to his SKULLGARD. Fortunately, for Jim, he was wearing his SKULLGARD. Sure, Jim sustained several injuries including a badly bruised shoulder and ankle, but neither was serious. He's smiling over the incident now.

And fortunately, for Jim also, the company he works for believes 100% in Accident Prevention! Their miners are fully equipped with SKULLGARDS. Congratulations, Jim!

Accident Prevention Does Pay!

JOSEPH PAINTER is a cager at the No. 6 Mine of the Union Collieries Company, North Bessemer, Pennsylvania.

While on duty at the bottom of the shaft January 7th, "Joe" was rerailing a car, when zowie . . . !

A piece of coal from the tippie fell down the shaft (a distance of 340 feet) and hit him on his SKULLGARD.



JOE PAINTER'S
SKULLGARD

The SKULLGARD was barely damaged as you can see from the photograph. Joe picked it up, put it back on his head and finished the shift. No lost time and NO HEAD INJURY for Joe.

These are but two of the many instances in which inexpensive SKULLGARDS are known to have saved lives.



The above are type "A" SKULLGARDS.

Type "B" SKULLGARDS are now available. They are lighter in weight and have even greater strength.

Write for additional information and demonstration.



Mine Safety  *Appliances Co.*
Braddock, Thomas and Meade Sts., Pittsburgh, Pa.
"Everything for Mine and Industrial Safety"

